

I claim:

1. A studded wall for use in a boiler or furnace comprising:
 - a plurality of substantially parallel tubes, each pair of adjacent tubes connected together to form a wall having a base and a top;
 - a set of first studs attached to at least one tube and covering a first region located between the base and the top of the wall such that any pair of adjacent first studs is a first selected distance apart; and
 - a set of second studs attached to the at least one tube and covering a second region located between the base and the top of the wall such that any pair of adjacent second studs is a second selected distance from one another;wherein the first region and second region are configured and positioned to define a line between the regions, the line having a width different from the first selected distance and the second selected distance.
2. The studded wall of claim 1 wherein the width of the line is at least one-half inch.
3. The studded wall of claim 1 wherein the first selected distance and the second selected distance are equal.
4. The studded wall of claim 1 wherein the width of the line is greater than the first selected distance and greater than the second selected distance.

5. The studded wall of claim 1 wherein the first studs and the second studs are cylindrical.

6. The studded wall of claim 5 wherein the first studs and the second studs each further comprises an annular ring.

7. The studded wall of claim 1 wherein at least one of the first selected distance and the second selected distance is 0.25 inches.

8. The studded wall of claim 1 also comprising a set of third studs attached to the at least one tube and covering a third region located between the base and the top of the wall such that any pair of adjacent third studs is a selected third distance from one another, wherein the third region is configured and positioned to define a second line between the second region and the third region, the second line having a width different from the second selected distance and the third selected distance, the line being a second selected elevation above the base of the wall.

9. The studded wall of claim 8 wherein the width of the second line is at least one-half inch.

10. The studded wall of claim 8 wherein the first selected distance, the second selected distance and the third selected distance are equal.

11. The studded wall of claim 1 wherein the first studs and the second studs have a diameter of from 10 mm to 12 mm.
12. The studded wall of claim 1 wherein the studs have a height of at least 3/4 inch.
13. The studded wall panel of claim 1 wherein the wall formed by the connected tubes is a replacement panel for a boiler.
14. An improved studded replacement panel for use in a boiler or furnace of the type having a plurality of rows of studs attached to a plurality of connected tubes wherein the improvement comprises the studs being grouped into at least two sets such that spacing between rows of studs within a set is different from spacing between adjacent rows from different sets.
15. The improved studded replacement panel of claim 14 wherein rows of studs within a set are positioned so that an ultrasonic probe cannot fit between adjacent rows of studs within a set.
16. The improved studded replacement panel of claim 14 wherein adjacent rows of studs within a set are not more than 0.25 inches apart.
17. The improved studded replacement panel of claim 14 wherein adjacent rows of studs from different sets are at least one-half inch apart.

18. An improved boiler or furnace of the type having at least one wall containing a replaceable panel of the type having a plurality of rows of studs attached to a plurality of connected tubes wherein the improvement comprises the studs being grouped into at least two sets such that spacing between rows of studs within a set is different from spacing between adjacent rows from different sets.

19. The improved boiler or furnace of claim 18 wherein rows of studs within a set are positioned so that an ultrasonic probe cannot fit between adjacent rows of studs within a set.

20. The improved boiler or furnace of claim 18 wherein adjacent rows of studs within a set are not more than 0.25 inches apart.

21. The improved boiler or furnace of claim 18 wherein adjacent rows of studs from different sets are at least one-half inch apart.

22. An improved boiler of the type having at least one studded boiler wall having a base, a top, and comprised of a plurality of substantially parallel tubes, each pair of adjacent tubes connected together wherein the improvement comprises the at least one studded boiler wall comprising:

a set of first studs attached to at least one tube and covering a first region located between the base and the top of the wall such that any pair of adjacent first studs is a first selected distance apart; and

a set of second studs attached to the at least one tube and covering a second region located between the base and the top of the wall such that any pair of adjacent second studs is a second selected distance from one another;

wherein the first region and second region are configured and positioned to define a line between the regions, the line having a width different from the first selected distance and the second selected distance.

23. The improved boiler of claim 22 wherein the width of the line is at least one-half inch.

24. The improved boiler of claim 22 wherein the first selected distance and the second selected distance are equal.

25. The improved boiler of claim 22 wherein the width of the line is greater than the first selected distance and greater than the second selected distance.

26. The improved boiler of claim 22 wherein the first studs and the second studs are cylindrical.

27. The improved boiler of claim 26 wherein the first studs and the second studs each further comprises an annular ring.

28. The improved boiler of claim 22 wherein at least one of the first selected distance and the second selected distance is 0.25 inches.

29. The improved boiler of claim 22 also comprising a set of third studs attached to the at least one tube and covering a third region located between the base and the top of the wall such that any pair of adjacent third studs is a selected third distance from one another, wherein the third region is configured and positioned to define a second line between the second region and the third region, the second line having a width different from the second selected distance and the third selected distance, the line being a second selected elevation above the base of the wall.

30. The improved boiler of claim 29 wherein the width of the second line is at least one-half inch.

31. The improved boiler of claim 29 wherein the first selected distance, the second selected distance and the third selected distance are equal.

32. The improved boiler of claim 22 wherein the first studs and the second studs have a diameter of from $\frac{3}{8}$ inches to $\frac{1}{2}$ inch.

33. The improved boiler of claim 22 wherein the studs have a height of at least $\frac{3}{4}$ inch.

34. A method for measuring corrosion in a boiler or furnace of the type having:

a plurality of substantially parallel tubes, each pair of adjacent tubes connected together to form a wall having a base and a top and the tubes having a known wall thickness;

a set of first studs attached to at least one tube and covering a first region located between the base and the top of the wall such that any pair of adjacent first studs is a first selected distance apart; and

a set of second studs attached to the at least one tube and covering a second region located between the base and the top of the wall such that any pair of adjacent second studs is a second selected distance from one another;

wherein the first region and second region are configured and positioned to define a line between the regions, the line having a width different from the first selected distance and the second selected distance;

the boiler having been operated for a selected period of time, the method comprising:

- a. cleaning a portion of the wall thereby creating a cleaned portion encompassing at least a portion of the line;
- b. placing an ultrasonic probe on the line at a point within the cleaned portion;
- c. measuring a wall thickness of the tube at the point;
- d. recording a recorded location of the point;
- e. recording a first wall thickness for that recorded location;
- f. at some later time cleaning the portion of the wall, using the recorded location of the point to locate the point on the tube; placing an ultrasonic probe on the line at the point and measuring a second wall thickness of the tube at the point; and

g. comparing the first wall thickness with the second wall thickness to determine a corrosion rate.

35. The method of claim 34 also comprising repeating steps f and g at another later time.

36. The method of claim 34 also comprising creating a corrosion profile for the boiler or furnace from the measured wall thicknesses.